April 22, 1969 C. F. MORAIN 3,439,814

PIPE BUNDLING MACHINE

Filed April 12, 1967 Sheet 1 of 2

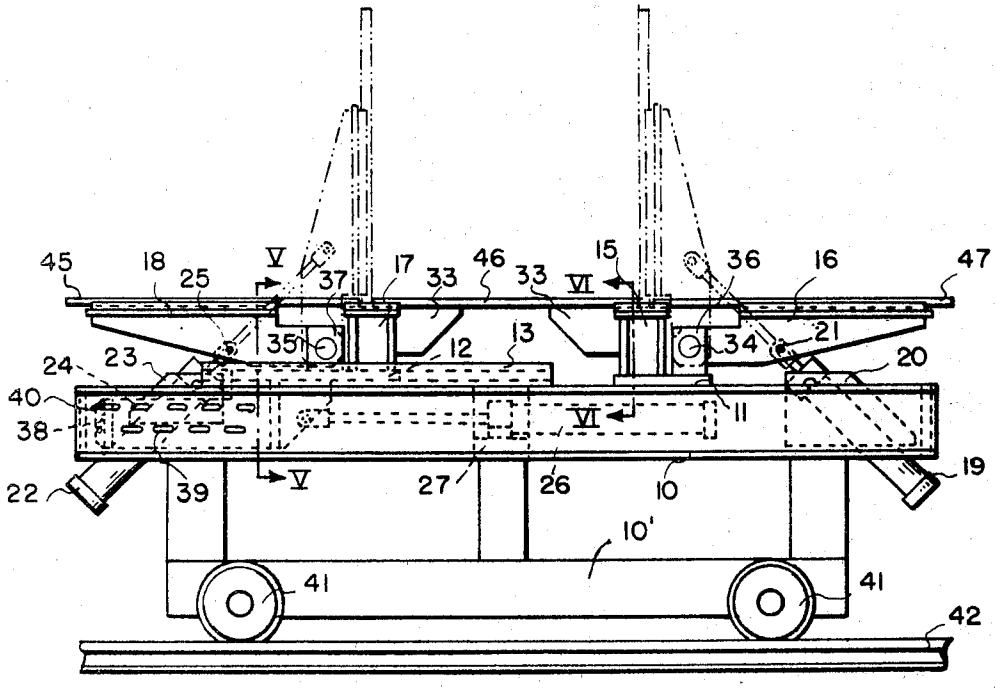


FIG. 1

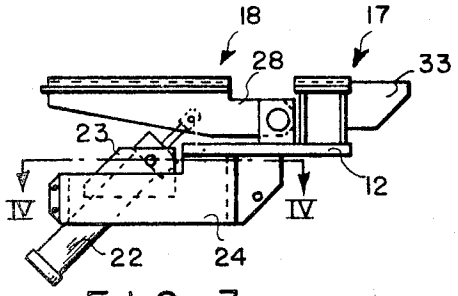


FIG. 3

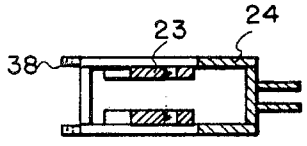


FIG. 4

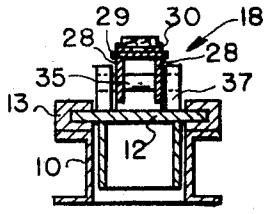


FIG. 5

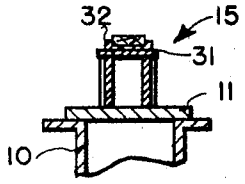


FIG. 6

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PIPE BUNDLING MACHINE

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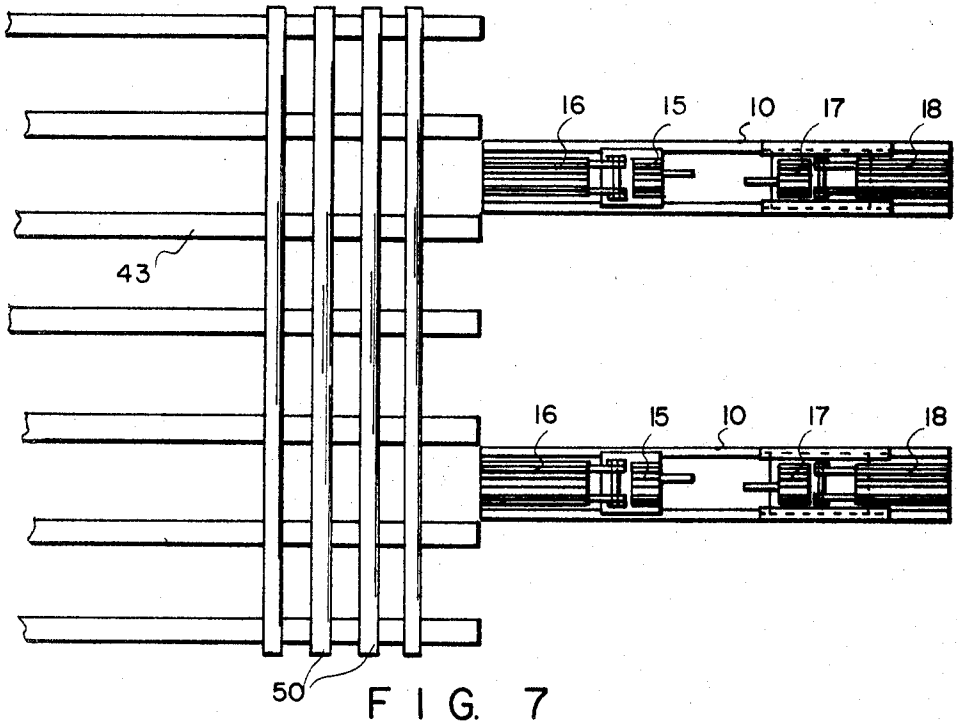


FIG. 7

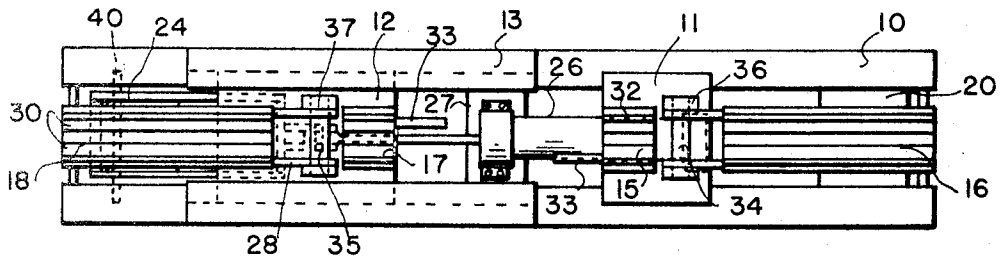


FIG. 2

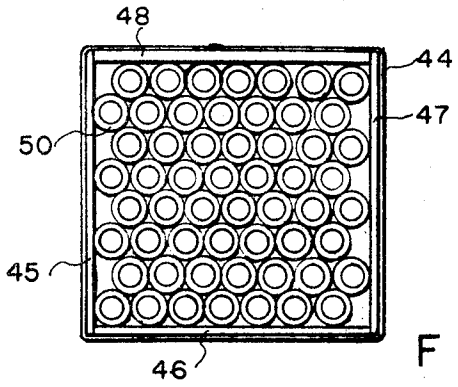


FIG. 8

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PIPE BUNDLING MACHINE

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U.S. Cl. 214—8 4 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a machine for forming bundles of a number of pipe lengths. A pair of supports of a fixed height are mounted on a frame and a second pair of supports are mounted outwardly and in line with the first pair on pivots closely adjacent the first supports. Hydraulic cylinders are provided to move the pivotally mounted supports from their horizontal position to a vertical position and a third cylinder moves one of the fixed height and the adjacent pivotally mounted supports toward and away from the other supports to vary the width of the bundle formed. Two or three bundling machines are used depending upon the length of the pipe to be bundled. The bundling operation is performed as follows: a length of strapping sufficient to encompass the bundle is placed along the centerline of the supports; a wooden slat whose length is equal to the width of the bundle is placed above the strapping on the fixed height supports; slats whose lengths are equal to the height of the bundle are placed on the pivotally mounted supports; a sufficient number of pipe lengths are placed on the slats at right angles thereto; the pivotally mounted supports are raised to their vertical positions; a slat is placed across the bundle and the strapping is joined to itself, after which the pivotally mounted supports are lowered to the normal position. The bundles formed are of rectangular cross-section.

This invention relates to apparatus for bundling steel pipe and more particularly to such apparatus which is capable of making bundles of rectangular cross-section of varying dimensions. When transporting steel pipe it is frequently desirable to secure a number of pipe lengths into a single bundle both to facilitate handling and to prevent movement of the pipe during transportation. If the pipe has been provided with a protective coating or wrapping it must be firmly secured against motion during handling and shipping to prevent scratching or nicking of the protective coating which may destroy the effectiveness of such coating. It is also desirable to form the pipe bundles so that they are rectangular in cross-section to most efficiently utilize the cargo holding area of, for example, railroad gondola cars in which the pipe is shipped to the consumer. It may also be desirable to vary the width of the pipe bundles.

A primary object of this invention is the provision of a pipe bundling machine which is capable of receiving lengths of pipe from a conveyor or the like and which positions the pipe lengths in a rectangular cross-section bundle. A further object of the invention is the provision of a pipe bundling machine for forming bundles of rectangular cross-section which is readily adjustable to vary the width of the bundle formed. Another object of the invention is the provision of a pipe bundling machine which is of rigid but economical construction and which is troublefree in opertion.

The above and other objects and advantages of the invention will become apparent upon consideration of

the following specification and the accompanying drawings.

In the drawing:

FIGURE 1 is a side elevational view of the pipe bundling apparatus of my invention;

FIGURE 2 is a plan view of the apparatus of FIGURE 1;

FIGURE 3 is a side elevational view of the adjustable supports and their associated frame;

FIGURE 4 is a plan view, in section, taken along the line IV—IV of FIGURE 3;

FIGURES 5 and 6 are transverse sectional views taken along the lines V—V and VI—VI, respectively, of FIGURE 1;

FIGURE 7 is a schematic plan view of a pipe bundling installation utilizing the apparatus of my invention; and

FIGURE 8 is an end elevation view of a pipe bundle formed by the apparatus of my invention.

Referring first to FIGURES 1 and 2, I provide a frame **10** to which are secured heavy plates **11** and **12**, plate **11** being rigidly fastened to the frame **10** and plate **12** being free to slide in a direction parallel to the longitudinal axis of frame **10** in ways **13**. Mounted on plate **11** is a stationary support **15** and a pivotal arm **16**. A similar support and arm **17** and **18**, respectively, are mounted on plate **12**. A hydraulic cylinder **19**, mounted on brackets **20** which are carried by frame **10**, has the free end of its rod connected to arm **16** by pin **21**. A second hydraulic cylinder **22**, mounted on brackets **23** which are carried by an open box-like frame **24** which is secured to and depends from plate **12**, has the free end of its rod connected to arm **18** by pin **25**. The frame **24** is connected to a hydraulic cylinder **26** which is rigidly mounted on a crossmember **27** of the main frame **10**.

As is seen in FIGURES 5 and 6, the arms **16** and **18** consist of spaced parallel plates **28** joined at their upper ends by a horizontal plate **29** which carries on its upper surface a pair of angles **30**. The stationary supports **15** and **17** are provided with similar plates **31** and angles **32** and have brackets **33** extending therefrom in a direction parallel to but offset from the longitudinal axis of the main frame **10**. The arms **16** and **18** are carried by heavy pins **34** and **35** which are journalled in trunnions **36** and **37** secured to plates **11** and **12**, respectively. Projections **38** on one end of the frame **24** are provided with holes to receive a pin or rod inserted through one of the holes **39** in the side portion of the main frame **10**, securing frame **24**, plate **12**, supports **17** and **18**, and cylinder **22** against motion during the bundling operation.

The bundling machine may be provided with a base **11** having wheels **41** to permit movement of the machine along rails **42**. When the apparatus is to be used it is positioned immediately adjacent the discharge end of a pipe conveying table or the like **43**. In FIGURE 7 two bundling machines are shown but it may be desirable to use three machines when long pipe lengths are being bundled to assure properly, tightly formed bundles. The support positioning hydraulic cylinder **26** of the machines may be controlled by a common actuator as may be the arm moving cylinders **19** and **20** to provide simultaneous operation of the machines. When the handling machines have been positioned at the end of pipe conveyor **43**, cylinder **26** is actuated to position the supports **17** and **18** in accordance with the desired width of the pipe bundle to be formed. A length of steel band or similar strapping material **44**, of sufficient length to encompass the formed pipe bundle, is positioned in the groove between angles **30** in such a way that the ends of the banding strap may be joined together at the top of the formed bundle. Wooden slats **45**, **46**, and **47** are placed above the strap **44** on the supports **15–18**; boards or slats **45** and **47** being of a length approximately equal to the height of the de-

sired bundle and board **46** being approximately equal in length to the width of the desired bundle. The number of pipe required may be determined from the diameter of the pipe and the height and width of the desired bundle and this number of pipe are transferred from table **43** to the bundling apparatus, the pipe lengths resting upon the slats **45**, **46** and **47** at right angles to the longtudinal axes of the bundling machines. Hydraulic cylinders **19** and **22** are now actuated, pivoting supports **16** and **18** to the vertical position shown in dotted outline in FIGURE 1 moving the pipe into a bundle configuration with rectangular cross-section. A fourth slat **48** of the same length as slat **46** is positioned across the top of the bundle in the same plan as slats **45–47** and the band **44** is tightened around the bundle and secured to itself. Cylinders **19** and **22** are now deactuated, lowering arms **16** and **18**. The formed and bound bundle is now ready to be removed from the bundling apparatus and loaded for shipping or storage as may be desired.

It should now be apparent that I have invented a new and useful device for bundling pipe lengths which fulfills the objects initially set forth. The width of the bundle formed may be varied by varying the separation of the supports **15** and **17** and the height varied by varying the number of pipe formed into the bundle. The apparatus is of simple design, rugged construction, and is capable of rapidly forming rectangular cross-section bundles of pipe.

Having described my invention what I claim is:

1. Apparatus for receiving a plurality of lengths of pipe and for positioning the same in a bundle, comprising: a frame, a pair of fixed height supports mounted on said frame and extending at right angles to the longitudinal axes of said pipe lengths; a second support pivotally mounted adjacent each of said fixed height supports, the upper surface of said pivotally mounted supports being on the same horizontal plane as the supper surface of said fixed height supports, and one of said fixed height supports and the associated pivotally mounted support being capable of movement toward and away from the other of said supports; means mounted on said frame to effect the motion of said first fixed height support and the associated pivotally mounted support toward and away from said second fixed height support and the associated pivotally mounted support; and means carried by said frame to rotate each of said second supports about its pivot.

2. Apparatus according to claim **1** further characterized in that said frame consists of a pair of longitudinally extending side members in spaced, parallel relationship joined by cross-members at the ends thereof, a plate spanning and secured to said longitudinally extending side members, one of said fixed height supports and the associated pivotally mounted support being secured to said plate, a second plate spanning said side members and slideable in a direction parallel thereto in ways secured to said side members, the second of said fixed height supports and associated pivotally mounted support being mounted on said second plate, an open box-like frame secured to and depending from said second plate and fitting within said side members, means to pivot the first of said pivotally mounted supports being mounted on said first-mentioned frame, said means to pivot the second of said pivotally mounted supports being mounted on said box-like frame, and said means to effect motion between said fixed height supports being mounted on said first-mentioned frame.

3. Apparatus according to claim **2** further characterized in that said means to rotate the first of said pivotally mounted supports is a hydraulic cylinder having its movable end secured to said pivotally mounted support, said means to rotate the second of said pivotally mounted supports is a hydraulic cylinder having its movable end secured to said pivotally mounted support, and said means to effect motion is a hydraulic cylinder having its movable end secured to said box-like frame.

4. Apparatus according to claim **2** further including means to releasably secure said second plate and associated pivots against motion toward and away from said first fixed height support.

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U.S. Cl. X.R.

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